Missouri
Department
of Transportation

MoDOT

105 West Capitol Avenue
P.O. Box 270
Jefferson City, MO 65102
(573) 751-2551
Fax (573) 751-6555
www.modot.org

Dave Snider, P.E., Interim Director

March 12, 2004

Dear Consultant:

The Missouri Highways and Transportation Commission is requesting the services of a consulting engineering firm to perform the professional services as described in the attached Request for Proposal (RFP). The RFP is for the Springfield – Branson regional advanced traffic management system development, deployment and support services.

If your firm would like to be considered for these consulting services, you may express your interest by responding as described in the attached RFP.

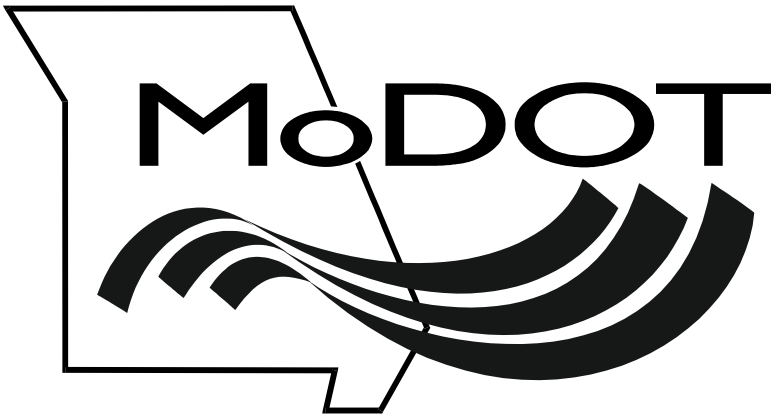
We request all proposals be received by 4:00 PM on April 2, 2004.

Sincerely,

Dave Nichols
Director of Project Development

rr
Attachment

cc: Mr. Steve McDonald-tr
Mr. Dale Ricks-8
Mr. Diane Heckemeyer-de
Ms. Sharon Taegel-ig



Request for Proposal

Dale Ricks, P.E.
District Engineer, Springfield Region
Missouri Department of Transportation
3025 E. Kearney
Springfield, Missouri 65803

Request for Proposal

SPRINGFIELD-BRANSON REGIONAL ADVANCED TRAFFIC MANAGEMENT SYSTEM DEVELOPMENT, DEPLOYMENT AND SUPPORT SERVICES

TABLE OF CONTENTS

LIST OF ACRONYMS

ATMS	Advanced Traffic Management System
CCTV	Closed-Circuit Television
DMS	Dynamic Message Sign
HAR	Highway Advisory Radio
IVR	Interactive Voice Response Telephone
MHTC	Missouri Highways and Transportation Commission
MoDOT	Missouri Department of Transportation
RFP	Request for Proposals
TMC	Transportation Management Center
VDS	Vehicle Detection Station

INTRODUCTION

This Request For Proposals (**RFP**) seeks proposals from qualified organizations (**Offeror**) to furnish the described services to the Missouri Highways and Transportation Commission (**MHTC**). Twelve (12) copies of each proposal must be mailed in a sealed envelope or hand-delivered in a sealed envelope to Mr. Dale Ricks, Missouri Department of Transportation, 3025 E. Kearney Street, Springfield, Missouri, 65803. Proposals must be returned to the offices of Mr. Dale Ricks no later than 4:00 p.m., March 26, 2004.

MHTC reserves the right to reject any and all bids for any reason whatsoever.

PROPOSAL

(1) The Offeror shall provide all necessary information requested in accordance with the terms and conditions requested in this RFP.

_____

Authorized Signature of Offeror: _____

Date of Proposal:_____

Printed or Typed Name:_____

Mailing Address:_____

City:_____State:_____Zip:_____

Telephone:_____Fax:_____

Electronic Mail Address:_____

_____

SECTION (1):
GENERAL DESCRIPTION AND BACKGROUND

(A) Request for Proposal: This document constitutes a RFP from qualified organizations to provide detailed system design, integration and implementation of an arterial and freeway event and congestion management system comprised of software, hardware, field devices, and communications infrastructure to meet the functional requirements set forth in the regional architecture for the MHTC, the Missouri Department of Transportation (**MoDOT**) and the City of Springfield.

(B) Background: The Springfield-Branson ITS initiative is comprised of two legacy systems that have been developed to provide signal coordination and incident management in the City of Springfield and an advanced traveler information system in the City of Branson. Partnerships have been developed between the City of Springfield and the Springfield District of MoDOT and the City of Branson and the Springfield District of MoDOT to promote the expansion and integration of these individual systems. The overall goal and objective of this RFP is to expand the systems' capabilities to include real-time processing of traffic flow data from system detection to identify and map levels of congestion along arterial and freeway segments, execution of predetermined event and congestion response plans, providing traveler information through the use of dynamic message signs, internet web pages, and possibly highway advisory radio and interactive voice response telephone. This system will need to work with other similar State of Missouri ITS activities and efforts.

Management and Operation (ITS) Activities in the City of Springfield

The City of Springfield and MoDOT established and continue to collaborate in ongoing management and operation of the Transportation Management Center (TMC), computerized traffic signal system, CCTV traffic monitoring system, and video distribution network. The two agencies utilize the facilities to monitor traffic flow, coordinate traffic signal operation, and respond to incidents through coordinating with the Springfield-Greene County Emergency Communications Center (911), dispatching maintenance, and modifying signal operation from the TMC as necessary.

The Springfield area traffic signal system is comprised of BI Tran Systems QuicNet/4 system software and 233 RV2.9 local software communicating over a dedicated metallic and fiber optic network for control and coordination of two hundred thirty-eight (238) MoDOT and City of Springfield signals. The joint CCTV traffic monitoring system provides video feed and control of twenty-six (26) roadside cameras through the use of a Pelco 9760 matrix switcher and Pelco VMX200 video management system. The camera video images are distributed to many MoDOT and City of Springfield offices, including 911, and are also broadcast every weekday morning on cable channel 23 and other local TV news programs. Snapshot camera images are also available on the interagency web page, OzarksTraffic.info.

Management and Operation (ITS) Activities in the City of Branson
The Branson area system (Branson TRIP) contains an IVR, HAR unit, Web Page, four (4) Pelco Cameras, two (2) dynamic message boards, and sixteen (16) traffic detectors. The system operates via voice phone lines in the area and information is analyzed, stored and networked via SofTec, Inc. developed software. The software used to disseminate the IVR and HAR messages is BIG CAT Systems and the CCTV cameras communicate and are viewable through PRISIM software. The hub for collection and dissemination of information of the system is housed in the City of Branson City Hall Engineering Department.

(C) Fiscal Year: The fiscal year runs from July 1-June 30.

SECTION (2): SCOPE OF WORK

(A) Services: The Offeror shall provide the following professional services:

Task 1 - Project Management – this task will provide project management activities throughout the duration of the project. Activities include, but are not limited to, project administration, project scheduling, project meetings, communication and distribution of project activities, documentation, financial management and tracking.

Task 2 - Review of Existing ATMS Documentation – this task will review all pertinent documents developed to gain an insight on existing regional and statewide systems and develop a document that will provide guidance in the development, deployment and support of the ATMS application. The Springfield ATMS system shall be completely interoperable with the Kansas City and St. Louis ATMS systems. Consideration must be given to incorporating components from or utilizing existing regional and/or statewide ATMS systems.

Task 3 - Concept of Operations Review and Update - this task will update the existing document that defines the environment in which the ATMS application operates. Information from documents reviewed in Task 2 will serve as the basis for this document's revision that includes defining and identifying major elements, practices and procedures, performance indicators, utilization environment, measures of effectiveness, and system life cycle.

Task 4 – Establish Two-Way Communication Link with Branson TRIP – this task will provide a plan to establish two-way communication between the Springfield TMC and the Branson TRIP system for data sharing, data archiving and Branson TRIP system operation from the Springfield TMC.

Task 5 – Federal Highway Administration Self Evaluation Report – this task will produce at the end of the project a Self Evaluation Report as required by the Federal Highway Administration. The format and content required in this report can be found at http://www.its.dot.gov/EVAL/eguide_intelfeval.htm.

Task 6 – Statewide ITS Initiatives – this task will review and coordinate with the three MoDOT Headquarters ITS projects: Missouri Statewide 511, Work Zone Management and Road

Weather Information Systems Development; Incident Management System; and Missouri Statewide Integrated Management and Operations System.

Task 7 - ATMS Build in the Development Environment – this task will install, integrate and test the developed ATMS application based upon a developed system test plan and acceptance criteria in a controlled environment prior to installation at the Traffic Management Center (TMC). This task includes the development of the integrated ATMS application.

Task 8 - ATMS Hardware Equipment Requirements – this task will review and update the existing system requirements document; and, outline the central system hardware, field hardware, communications hardware and additional TMC components needed for operation and integration with the region's legacy systems. Utilization of existing hardware equipment shall be fully considered in this task.

Task 9 - ATMS Build in the Production Environment – this task will incrementally install and configure the developed ATMS application with the legacy system components and new expansion components based on the system test plan and acceptance criteria developed during Development Environment Task 7.

Task 10 - Documentation Management – this task will compile all documents developed during the entire project into an acceptable electronic reproducible format that can be updated to reflect future changes to the ATMS application. Documentation shall include, but is not limited to the following deliverables: Operators Manual, System Administration Manual, Hardware Maintenance Manual, and Software Maintenance Manual. Critical components of the system shall be identified and a process for recovery of the system in the event of failure due to man made or natural disasters shall be included within these documents.

Task 11 - Operation/Maintenance Requirements Development – this task will develop all associate future operation and maintenance activities needed to ensure the most effective utilization of the ATMS application. This task includes providing documentation on software, hardware equipment, telecommunication components and all field devices.

Task 12 - Training - this task will provide all necessary training needed to perform operational, management and administration duties of the ATMS application.

Task 13 - Warranty – this task will provide the necessary services to correct failures or malfunctions to the developed and deployed ATMS application for a period of one year after MoDOT's approval of the final system testing and acceptance report.

Task 14 – Maintenance Support Development – this task will develop a procedure and process for the maintenance and ongoing operations support of the ATMS application for a three-year period after MoDOT's approval of the final system testing and acceptance report. MoDOT will reserve all rights to extend the contract under an amendment agreement or to seek other organizations to provide the three-year period support services. Required resources will be for the development of the procedure and process only under this task.

(B) Specific Requirements: MoDOT and the City of Springfield have developed a complete set of "User Requirements" and "System Requirements" that are available upon request. The project specific "System Requirements" are found in Appendix A. Other statewide and regional

documents and activities will be considered for incorporation into the application as appropriately determined.

(C) Administration of Program: The Offeror will consult MHTC's representative regarding any problems involved with the administration of the services provided pursuant to this RFP.

SECTION (3):
PROPOSAL SUBMISSION INFORMATION

(A) SUBMISSION OF PROPOSALS

1. **Signature:** Proposals should be signed and returned (with necessary attachments) to Mr. Dale Ricks as provided in this RFP. Specifically, any form containing a signature line in this RFP and any amendments, pricing pages, etc., must be manually signed and returned as part of the proposal.

2. **Submission of All Data Required:** The Offeror must respond to this RFP by submitting all data required in paragraph (B) below for its proposal to be evaluated and considered for award. Failure to submit such data shall be deemed sufficient cause for disqualification of a proposal from further consideration.

3. **Public Inspection:** The Offeror is hereby advised that all proposals and the information contained in or related thereto shall be open to public inspection and that MHTC does not guarantee nor assume any responsibility whatsoever in the event that such information is used or copied by individual person(s) or organization. Therefore, the Offeror must submit its proposal based on such conditions without reservations.

4. **Clarification of Requirements:** Any and all questions regarding specifications, requirements, competitive procurement process, or other questions must be directed to:

   Ms. Laurel McKean
   Missouri Department of Transportation
   3025 E. Kearney Street, Springfield, Missouri, 65803
   (417) 895-7636 (phone)
   (417) 895-7664 (fax)
   laurel.mckean@modot.mo.gov (email).

5. **DBE Participation:** Offerors are encouraged to use DBE participation in their proposals. A DBE goal of 8% has been established for this proposed professional service contract. Offerors are required to quantify the amount of minority and/or female participation in their proposal.

(B) REQUIRED ELEMENTS OF PROPOSAL

The Offeror will provide twelve (12) 8 ½" x 11" copies of their proposal that shall not exceed thirty (30) pages in length which will include the following:

1. **Business Organization**: State the full name and address of your lead team organization and, if applicable, the branch office or subordinate element that will perform or assist in performing the service requested. Reference information shall be provided indicating the name, title and telephone number of at least three (3) officials of previous or current clients in which similar work was performed over the past three (3) years.
2. **Project Understanding**: Present your understanding and knowledge of this project as presented in the proposed Scoping of Work and how you will pursue and complete each task. An estimate of time needed to perform Task 4 through and including Task 11 shall be provided as part of project understanding. Table in Section 4 (D) shall be completed as part of this RFP.

3. **Time Frame**: Include a timetable for completing the various elements of the project. The project completion date should be no later than eighteen - (18) months after the notice to proceed.

4. **Consultant Qualifications and Prior Experience**: Include statements concerning the recent related experience of the persons from your team who will be actively engaged in the proposed effort. Do not include team member experience unless persons who will work on this project participated in that experience. Emphasis should be placed on experience directly applicable to the project requirements. Team member experiences should include references to their involvement with the activities of development, deployment and support of ATMS services. Prior experience should include a contact person from each organization that was provided these ATMS services.

5. **Personnel**: Specific background information on key individuals, who will be assigned to the project, should be included. The background information on these individuals should emphasize their experience relative to this project's requirements. A general resume is not a satisfactory substitute for this information.

6. **Authorized Negotiators and Project Manager**: Include the names and telephone numbers of the Offeror's authorized personnel that will negotiate and manage the proposed contract.

(C) EVALUATION CRITERIA AND PROCESS

1. **Evaluation Factors:** Any agreement for services resulting from this RFP shall be awarded to the Offeror providing the best proposal to MHTC and the City of Springfield. After determining responsiveness, proposals will be evaluated in accordance with the following criteria:

   A. Experience, expertise and reliability;
   B. Proposed Method of Approach;
   C. Past Performance and Recommendations from references;
   D. The affirmative action program of the Offeror;
   E. Overall clarity and quality of proposal;

F. Accessibility; and
G. Familiarity and Capability.

2. **Historic Information:** MHTC and the City of Springfield reserve the right to consider historic information and facts, whether gained from the Offeror's proposal, question and answer conferences, references, or other sources, in the evaluation process.

3. **Responsibility to Submit Information:** The Offeror is cautioned that it is the Offeror's sole responsibility to submit information related to the evaluation categories and that MHTC's representative is under no obligation to solicit such information if it is not included with the Offeror's proposal. Failure of the Offeror to submit such information may cause an adverse impact on the evaluation of the Offeror's proposal.

(D) PROJECT SCHEDULE

1. **Estimated Time Required:** List the estimated time (in total hours or equivalent days) needed to complete each task:

Task Number	Estimated Time Needed

2. **Selection and Award Schedule:** The following are estimated dates for consultant selection and contract implementation:

Action	**Date**
RFP Due	April 2, 2004
Notification of Short List	April 16, 2004
Consultant Oral Presentations	April 28 & 29, 2004
Notification of Selected Consultant/Contract Negotiations Start	May 13, 2004
Contract Negotiations Completed	May 27, 2004
PSC Approval of Consultant Executed Documents	June 3, 2004
MHTC Approval	Mid July 2004
Notice to Proceed – Award	Late July 2004

APPENDIX A: PROJECT SPECIFIC ATMS SYSTEM REQUIREMENTS

1	Historical Data	3.2.2.1	Basic Course of Action: Raw traffic and processed data shall be collected by the System and stored so it can be accessed in the future.
2	Historical Data	3.2.2.1	All stored data shall be tagged with recorded time and date.
3	Historical Data	3.2.2.1	Volume data shall be stored for each system vehicle detector.
4	Historical Data	3.2.2.1	Occupancy data shall be stored for each system vehicle detector.
5	Historical Data	3.2.2.1	Speed data shall be stored for each system vehicle detector designated to calculate speed.
6	Historical Data	3.2.2.1	For arterials, 5 minute, 15 minute and hourly data shall be stored for each differentiable detector and consolidated detection stations at mid-block locations and intersection approaches (advanced detectors), where available.
9	Historical Data	3.2.2.1	For freeways, the ATMS shall store 20 second, 15 minute and hourly data for each detector and detector station.
10.1	Historical Data	3.2.2.1	Communications, DMS, and VDS failures shall be stored when available. Optional: CCTV failures shall be stored when available.
11	Historical Data	3.2.2.1	Event locations and detailed shall be stored.
12	Historical Data	3.2.2.1	Executed response plan details shall be stored.
13	Historical Data	3.2.2.1	DMS message content shall be stored. Optional: HAR and IVR message content shall be stored.
14	Historical Data	3.2.2.1	Confirmed and denied events, including incidents, shall be stored.
15	Historical Data	3.2.2.1	13 months of historical data shall be stored online.
15.1	Historical Data	3.2.2.1	There shall be a way to export historical data to MoDOT TMS.
16	Historical Data	3.2.2.1	Historical data shall be made available for long-term storage offline.
17	Reports	3.2.2.2	Basic Course of Action: The System shall provide an interface to historical data.
18	Reports	3.2.2.2	The System shall allow authorized users to select the type of report to be run.
19	Reports	3.2.2.2	Authorized users shall be able to select the traffic information and time period to be analyzed.
20	Reports	3.2.2.2	The System shall provide pre-defined reports determined through detailed design efforts that can be viewed on screen or viewed by printing the report.
21	Congestion	3.2.2.3	Basic Course of Action: The Traffic Engineer shall be able to list, view and modify Congestion Management parameters.
23	VDS Status	3.2.2.3	The System shall provide an interface to allow authorized users to view and set the VDS color thresholds.

53	Railroad	3.2.4.4	Status information shall be collected from the railroad-crossing system.
54	Railroad	3.2.4.4	The status information shall contain an indication of railcars blocking the roadway traffic, indication of currently displayed DMS messages and equipment failure, if available.
55	Railroad	3.2.4.4	The System shall log failures detected in the DMS, rail crossing detectors and communications systems, when available.
75	VDS Data Arterial	3.2.4.8	The System shall receive any operational status (health), if available, from the vehicle detection station controller.
76	VDS Data Arterial	3.2.4.8	Raw data shall be collected from mid-block detectors, if available.
77	VDS Data Arterial	3.2.4.8	Data from detectors at intersections shall be collected and compensated for signal effects on traffic flow.
79	VDS Data Arterial	3.2.4.8	The System shall process all vehicle detector data within the polling period.
80	VDS Data Arterial	3.2.4.8	The System shall log failures detected in the vehicle detectors, controllers or communications systems.
87	VDS Data	3.2.4.10	Basic Course of Action: For each polling period, the System shall process detector data to obtain volume, normalized occupancy, estimated speed, and status for each system detector.
89	VDS Data	3.2.4.10	The System shall process data to find detector and station volumes over 5 minutes and 15 minutes.
91	VDS Data Arterial	3.2.4.10	The System shall calculate station average speed, average and total volume, and average occupancy across lanes per mainline vehicle detection station and across lanes per intersection approach, as available.
93	VDS Data Freeway	3.2.4.10	For freeway, station level volume, occupancy or speed (Operator selectable) shall be displayed on the map.
94	VDS Data	3.2.4.10	If the Operator selects station from the map display, congestion details collected for that station from the last report for the controller, 5-minute statistics, and 15-minute statistics shall be displayed.
95	VDS Data Freeway	3.2.4.10	Congestion details shall include volume, occupancy, estimated speed, status, and time of last report from the controller.
96	VDS Data	3.2.4.10	Vehicle detector shall be checked by the System and flagged with at least three status levels including: 1) OK, 2) Failed, and 3) Disabled.
97	VDS Status Arterial	3.2.4.10	For arterials, traffic conditions shall be displayed as light, medium or heavy based on user-settable parameters.
101	Web External	3.2.5	The Traveler shall receive information through external access to web page.
103	Web External	3.2.6.1.1	Basic Course of Action: The System shall process for display real-time traffic flow and event information for the freeway and arterial networks on web map page for external access.

104	Web External DMS	3.2.6.1.1	Current DMS messages shall be displayed on the web map page.
105	Web External Congestion	3.2.6.1.1	The System shall display current congestion information on freeways and arterials as color-coded segments on the map.
106	Web External Event	3.2.6.1.1	Scheduled lane closure and special event information shall be available on the web page for external access.
107	Web External DMS	3.2.6.1.1	Icons shall be provided which correspond to locations where freeway and arterial DMS are located.
108	Web External DMS	3.2.6.1.1	The DMS icon shall be color-coded to reflect the operational state of the DMS: available, unavailable (due to equipment or communications failure), and message active.
109	Web External DMS	3.2.6.1.1	When a DMS icon is selected from the map, a textual window shall be opened with location, operational status, and current message.
112	Web External Parking	3.2.6.1.1	An icon, denoting the status of each parking lot being monitored shall be displayed on the map.
113	Web External Parking	3.2.6.1.1	The parking lot icon shall be color-coded to reflect the states: available, near capacity, full and no information.
114	Web External Parking	3.2.6.1.1	When a parking lot icon is selected from the map, a textual window shall be opened with location, current percentage of occupancy.
117	Web External Railroad	3.2.6.1.1	An icon, denoting the status of the railroad crossing shall be displayed on the map.
118	Web External Railroad	3.2.6.1.1	The railroad-crossing icon shall be color-coded to reflect the available states: intersection open, intersection blocked, or no data available.
119	Web External Railroad	3.2.6.1.1	When a railroad-crossing icon is selected from the map, a textual window shall be opened with location and operational status.
127	Web External Congestion	3.2.6.1.1	The System shall be capable of displaying color encoded congestion levels for each segment of monitored arterials.
128	Web External Congestion	3.2.6.1.1	Traffic flow conditions shall be classified in three (3) color codes for light, medium and heavy congestion levels.
129	Web External Congestion	3.2.6.1.1	In case of insufficient good data from system detectors, the map shall display color-code for no data.
130	Web External Map	3.2.6.1.2	Basic Course of Action: The System shall provide the traveler with a map of the Springfield Region.
131	Web External Map	3.2.6.1.2	The base map shall depict freeways, state highways, major and minor arterials.
132	Web External Map	3.2.6.1.2	Each of these roadway types shall be distinguishable on the map: Freeways, major arterials, and minor arterials.
133.1	Web External	3.2.6.1.2	The web page display shall provide graphical and textual information for confirmed incidents.
134	Web External	3.2.6.1.2	The Traveler shall be able to view scheduled freeway and arterial activities for maximum of 24 hours in advance and the System shall support importing from MoDOT TMS.
136	Web External	3.2.6.1.2	Additional information shall include current status for railroad crossings and parking lots, current DMS messages, and incident details for displayed incidents and scheduled lane closures.

171	Railroad	3.2.6.2.1	If the railroad crossing remains blocked for an extended period of time (operator definable), the Operator shall be alerted (an alert is defined to be a non-critical condition that requires no immediate Operator intervention).
257	Disseminate Transit	3.2.6.16	A hotlink to the CU Transit web site shall be provided to the Traveler and Other Agency users.
258	Disseminate Airport	3.2.6.17	A hotlink to the Springfield-Branson Regional Airport web site shall be provided to the Traveler and Other Agency users.
263	DMS	3.2.8.1	Basic Course of Action: The Operator shall be able to select a DMS and view the message currently displayed on the sign.
264	DMS Edit	3.2.8.1	The Operator shall be able to modify, compose, or edit the content of any DMS message except congestion messages.
265	DMS Control	3.2.8.1	Upon Operator approval, the System shall send messages to the selected DMS.
268	DMS Control	3.2.8.1	DMS messages shall remain on display until the Operator blanks the DMS or replaces the message.
270	DMS Control	3.2.8.1	For event response plan DMS messages, the Operator shall have the ability to remove messages from the response plan or send messages to the DMS.
271	DMS Congestion	3.2.8.1	Congestion messages shall remain on display and update automatically whenever traffic conditions change.
272	DMS Control	3.2.8.1	The Operator shall be able to override the congestion messages by sending response plan DMS messages or manually created DMS messages.
273	DMS Status	3.2.8.1	All detected DMS errors shall be logged.
275-286*	Optional: HAR and IVR	3.2.8.2	(Highway Advisory Radio and Interactive Voice Response Systems considered optional at this time.)
275	HAR/IVR	3.2.8.2	Basic Course of Action: The Operator shall be able to select a HAR or IVR icon from the map and view the current talk group.
276	HAR/IVR	3.2.8.2	Voice message segments shall be stored and assembled into sentences to construct whole messages.
277	HAR/IVR	3.2.8.2	The Operator shall be able to modify, compose, or edit the content of any HAR or IVR talk group message except congestion messages.
278	HAR/IVR	3.2.8.2	Upon Operator approval, the System shall send event messages to the selected HAR and/or IVR server.
280	HAR/IVR	3.2.8.2	If approved, the event messages shall go to queue. If not approved, it shall not go to queue.
281	HAR/IVR	3.2.8.2	The HAR and IVR messages shall be transmitted until the

			Operator replaces the message or it times out based on a preset termination time.
283	HAR/IVR	3.2.8.2	Congestion messages shall remain active and update automatically whenever traffic conditions change.
284	HAR/IVR	3.2.8.2	The Operator shall be able to override the congestion messages by sending response plan HAR or IVR messages, or manually created messages.
285	HAR/IVR	3.2.8.2	All detected HAR and IVR errors shall be logged.
286	HAR/IVR	3.2.8.2	The System shall create and distribute appropriate parking status messages based on the status provided by the Operator.
287	System Admin. Database	3.2.10.1	Basic Course of Action: The System shall provide the Administrator the ability to query the database.
288	System Admin. Database	3.2.10.1	The System shall provide the Administrator the ability to monitor database performance.
289	System Admin. Database	3.2.10.1	The System shall provide the Administrator the ability to back up the database.
290	System Admin. Database	3.2.10.1	The System shall provide the Administrator the ability to restore the database, when needed.
291	System Admin. Database	3.2.10.1	The System shall provide the Administrator the ability to revise the database, when needed.
292	System Admin. Database	3.2.10.1	The System shall provide the Administrator the ability to establish access for another individual to work in the database.
293	System Admin. Backup	3.2.10.2.1	The System shall have back-up device(s) capable of handling the back-up storage of data.
294	System Admin. Backup	3.2.10.2.1	The System shall have automatic back-ups in place.
296	System Admin. Monitoring	3.2.10.2.2	The Operating System shall provide a system account capable of tracking user login and logout information.
298	System Admin. Monitoring	3.2.10.2.2	The Administrator shall be able to perform software upgrades to the installed software from the root account.
299	System Admin. Monitoring	3.2.10.2.2	The System shall be able to record the following events: use of identification and authentication mechanisms, and actions taken by the System Operators.
300	System Admin. Monitoring	3.2.10.2.2	The System shall use an off-the-shelf network management tool that monitors network traffic, gives status of each node on the network, and configure and control routers and printers.
301	System Admin. Security	3.2.10.2.3	Basic Course of Action: The System shall allow the Administrator to assign unique user accounts and passwords to an individual user.
302	System Admin. Security	3.2.10.2.3	The System shall allow the Administrator to delete user accounts.
303	System Admin. Security	3.2.10.2.3	The root account shall be accessible only by authorized personnel and shall be the highest privileged account with access to all operating system functions.

304	System Admin. Security	3.2.10.2.4	Basic Course of Action: The Administrator shall assign a user account and password to the individual user.
305	System Admin. Security	3.2.10.2.4	The Administrator shall also set user and file access privileges.
306	System Admin. Security	3.2.10.2.4	The System shall have the following capabilities: user identification, user authentication, and user access control.
307	System Admin. Security	3.2.10.2.4	The System shall require users to enter a login name and password prior to granting any access.
308	System Admin. Security	3.2.10.2.4	The System shall use passwords to authenticate a user's identity.
309	System Admin. Security	3.2.10.2.4	If either the account or password does not exactly match, access shall be denied.
310	System Admin. Security	3.2.10.2.4	The System shall protect authentication data so that any unauthorized user cannot access it.
311	System Admin. Security	3.2.10.2.4	The System shall enable a user account upon the commands of an authorized Operator with access privileges to authentication data.
313	System Admin. Database	3.2.10.3	Basic Course of Action: The System shall provide an interface to allow a user to add, modify and delete system elements including field devices, arterial and freeway network configurations.
314	System Admin. Database	3.2.10.3	The System shall provide three levels of database access privileges: 1) browse data; 2) browse, insert, and edit data; 3) browse, insert, edit, and delete data.
315	System Admin. Database	3.2.10.3	Database access privileges shall be based on login levels.
316	System Admin. Database	3.2.10.3	The System shall allow the user with the required privilege to update information on a specific record in the database.
317	System Admin. Database	3.2.10.3	The System shall allow the user with the required privilege to delete a record from all applicable database tables in a single operation.
318	System Admin. Database	3.2.10.3	The System shall allow the user with the required privilege to insert a new record in any of the freeway and arterial configuration tables in the database.
319	System Admin. Database	3.2.10.3	The System shall provide capabilities for sorting and filtering records within the database.
323	Congestion	3.2.11	Based on the user-defined parameters, the System shall identify areas of heavy congestion.
324	Congestion Arterial	3.2.11	On arterials, if in congestion messaging mode, when congestion increases to "alarm heavy" congestion levels, congestion messages shall be sent to one or more DMS queues. Option: Congestion messages shall be broadcast on the HAR and made available on the IVR system.
325	Congestion Arterial	3.2.11	When traffic congestion levels change, the System shall automatically update the arterial DMS queue. Option: The System shall also update the HAR and IVR messages.

326	Congestion	3.2.12.2.1	Basic Course of Action: The System shall analyze vehicle detector data in predefined segments of freeway and arterial systems to determine the level of congestion.
327	Congestion VDS	3.2.12.2.1	On a periodic basis, the System shall analyze vehicle detector data over a number of polls to determine the prevailing level of congestion for the segment.
328	Congestion Arterial	3.2.12.2.1	On arterials, congestion shall be classified as: light, medium heavy and alarm heavy
329	Congestion Arterial	3.2.12.2.1	If insufficient good data is available for that period, the System shall not determine the level of congestion.
330	Congestion Response	3.2.12.2.3	Basic Course of Action: The System shall automatically generate appropriate DMS congestion messages based on the level of congestion. Option: HAR and IVR shall also be automatically generated.
331	Congestion Response	3.2.12.2.3	The System shall automatically update DMS congestion messages on a periodic basis. Option: HAR and IVR shall be updated periodically.
332	Congestion	3.2.12.2.3	The Operator shall have the ability to disable (off) congestion messaging.
333	Congestion	3.2.12.2.3	The Operator shall be able to override congestion messages with higher priority messages.
334	Congestion Arterial	3.2.12.3	For arterials, traffic conditions shall be graphically displayed as color-coded segments on the map.
337	Congestion Freeway	3.2.12.3	For freeways, traffic conditions shall be graphically displayed as color-coded elements on the map.
338	Congestion Freeway	3.2.12.3	Each freeway VDS shall be color-coded as light, medium, and heavy
339	Congestion Freeway	3.2.12.3	On the freeways the operator shall be able to select speed, volume, or occupancy to be displayed on the map as different colors for each VDS.
340	Congestion Freeway	3.2.12.3	Freeway speed, volume, and occupancy information shall also be available for textual display.
344	Field Data	3.2.12.3.2	If no data is available, the field element icon shall be shown with a predefined default color.
345	VDS Map	3.2.12.3.2	VDS icons shall also be able to display color-coded volumes, occupancies, and speeds.
353-356*	Optional: HAR	3.2.12.3.2	(Highway Advisory Radio considered optional at this time.)
353	HAR	3.2.12.3.2	Icons shall be provided which correspond to locations where HAR transmitters are located.
354	HAR	3.2.12.3.2	When a HAR icon is selected from the map, a textual window shall be opened.
355	HAR	3.2.12.3.2	The textual window shall indicate details about the selected HAR.

356	HAR	3.2.12.3.2	HAR details shall include: location, status, current message info, and date and time of last data update.
357	DMS Status	3.2.12.3.2	The System shall monitor the DMS and communications systems for failures, assuming that the status information is available.
358	DMS Map	3.2.12.3.2	Icons shall be provided which correspond to locations where freeway and arterial DMS are located.
359	DMS Status	3.2.12.3.2	The DMS icon shall be color-coded to reflect the operational state of the DMS: available, unavailable (due to equipment or communications failure), and message active.
360	DMS Map	3.2.12.3.2	When a DMS icon is selected from the map, a textual window shall be opened.
361	DMS Map	3.2.12.3.2	The textual window shall indicate details about the selected sign.
368	Railroad	3.2.12.3.2	An icon, denoting the status of the railroad crossing shall be displayed on the map.
369	Railroad	3.2.12.3.2	The railroad-crossing icon shall be color-coded to reflect the available states: intersection open, intersection blocked, or communications failure.
370	Railroad	3.2.12.3.2	If the railroad crossing remains blocked for an extended period of time (Operator definable), the Operator shall be alerted.
371	Railroad	3.2.12.3.2	When a railroad-crossing icon is selected from the map, a textual window shall be opened with location, status, and date and time of last data update.
391	VDS Status Freeway	3.2.12.3.2	Traffic flow conditions shall be classified in 3 color codes.
396	VDS Status Freeway	3.2.12.3.2	Lane-by-lane data shall be available for freeway detectors.
397	VDS Status	3.2.12.3.2	If insufficient good data is available from the VDS, the VDS icon shall display a default color.
399	VDS Status	3.2.12.3.2	The System shall trigger an alarm when traffic conditions reach alarm heavy status.
400	VDS Map	3.2.12.3.2	When a VDS icon is selected from the map, a textual window shall be opened with the following info: location, current date, time stamp, status, volume, occupancy, and speed on a lane-by-lane basis, if available.
404	Map	3.2.12.3.3	Basic Course of Action: The System shall provide the Operator with a map of the Springfield Region.
405	Map	3.2.12.3.3	The base map shall depict freeways, state highways, major and minor arterials as separate map layers.
406	Map	3.2.12.3.3	The map shall display all field devices, including VDS, DMS, CCTV, ramp meters, traffic signals, RWIS, HAR, parking lots, railroad crossings, and events as separate map layers, as available.
408	Map	3.2.12.3.3	The System shall allow the Operator to toggle on or off the display of map layers, field device icons and events icons.

410	Map	3.2.12.3.3	When an icon is selected, the System shall display the following information: 1) Device ID, 2) Roadway type (freeway or arterial), direction and milepost (or block number), 3) Device type, 4) Device configuration and 5) Display operational status.
411	Congestion	3.2.12.3.3	The Operator shall be able to click on a congestion segment to obtain the current congestion index and index thresholds.
445	Event	3.2.14.2.2	Basic Course of Action: The System shall allow the Operator to manually enter an event location.
446	Event	3.2.14.2.2	For an unplanned event that is added manually, the System shall request at a minimum, the following information from the Operator: road type, location, and event type.
447	Event	3.2.14.2.3	Basic Course of Action: For an unplanned event, the System shall request event details from the Operator.
448	Event Scheduled	3.2.14.2.3	For a scheduled event, the System shall request event details from the Operator at the time the event is scheduled.
449	Event	3.2.14.2.3	Event details shall include, as applicable, specific type of event, blockage pattern, an estimated start time, and estimated end time of event.
451	Event	3.2.14.2.3	The Operator shall be able to manually enter duration for any event type.
452	Event Scheduled	3.2.14.2.4	Basic Course of Action: The Operator shall be able to enter a scheduled event before it occurs.
453	Event Scheduled	3.2.14.2.4	For a scheduled event, the System shall request at a minimum, the following information from the Operator: road type, roadway, direction, nearest cross street to the location, scheduled start time, scheduled end time, and event type.
454	Event Scheduled	3.2.14.3	The System shall allow the Operator to construct an event response plan for a scheduled event.
455	Event	3.2.14.3	Basic Course of Action: The System shall display all current, planned, and scheduled events on the map.
456	Event	3.2.14.3	The Operator shall be able to view event details by selecting the icon from the map.
457	Event	3.2.14.3	Events shall be represented by distinct icons with attributes that stand out on the display.
458	Event	3.2.14.3	Terminated events shall be removed from the map display.
469	Response	3.2.14.6.2	Basic Course of Action: After viewing the response plan, the Operator shall have the ability to modify: recommended DMS signs and messages, user recommended HAR locations and messages (as available), recommended message to be displayed on the web page, and recommended Operator actions.
470	Response	3.2.14.6.3	Basic Course of Action: Once the event response plan has been generated and approved the Operator shall have the option to send all response plan messages at one time.
471	Response	3.2.14.6.3	The Operator shall have the option to send response plan DMS messages individually.

472	Response	3.2.14.6.3	The Operator shall be able to specify the Operator actions that have been executed in response to an event.
473	Response	3.2.14.6.3	The Operator shall be able to approve or deny the recommended usage of HAR/IVR and beacons in response to an event (as available).
474	Response	3.2.14.6.3	The Operator shall be able to send the desired message to the web page.
476	Response	3.2.14.6.4	Basic Course of Action: When an event is in a scheduled state, the System shall allow the Operator to generate a response plan but not implement the plan.
477	Response	3.2.14.6.4	When an event is in confirmed state, the System shall allow the Operator to generate and implement a response plan.
478	Response	3.2.14.6.4	The Operator shall be able to choose a System generated response plan or a plan defined by the Operator without assistance from the ATMS.
479	Response	3.2.14.6.4	A response plan shall consist of the following: recommended DMS and messages; recommended message to be displayed on the web page; recommended Operator actions; and recommended HAR locations and HAR/IVR messages (as available).
480	Response	3.2.14.6.4	If the Operator requests a System generated response plan, the AMTS shall use event details, including event location, time of event, blockage pattern, and specific type of event, to generate Operator actions, a DMS response plan, a web page message, and HAR/IVR messages (as available).
482	Event	3.2.14.7	Basic Course of Action: The Operator shall be able to terminate a confirmed event.
483	Event	3.2.14.7	The System shall request termination verification from the Operator.
484	Event	3.2.14.7	Once the event is terminated, the System shall prompt the Operator to terminate all associated response actions.
487	Event	3.2.14.7	The event shall be removed from the real-time display and stored in the database.
488	Event	3.2.14.7	When the estimated duration for an event expires, the system shall prompt the operator by flashing the event icon and/or audible alarm.
495	Field Device Communication	4.2.2	The ATMS shall interface with field devices using standard NTCIP protocol to the extent the protocol has been adopted at the time of detailed design.
496	Field Device Communication	4.2.2	At a minimum, the ATMS shall be capable of sending and receiving all mandatory global and device specific objects for each device type (including DMS and VDS).
499	DMS Control	4.2.2.1.1	The ATMS shall provide commands to display messages on the DMS.
501	DMS Control	4.2.2.1.1	The uploading and downloading of message parameter data shall

			be supported.
516	Railroad	4.2.2.1.4	Status information shall be collected from the railroad-crossing system.
517	Railroad	4.2.2.1.4	The status information shall contain an indication of railcars blocking the roadway traffic, indication or currently displayed DMS messages, and equipment failure, if available.
529-534*	Optional: HAR and IVR	4.5.2	(Highway Advisory Radio and Interactive Voice Response Systems considered optional at this time.)
529	HAR/IVR	4.5.2	The ATMS shall pass real-time congestion limits, event details, closure, special event and general traveler information to the HAR/IVR central server.
530	HAR/IVR	4.5.2	Composite messages shall then be placed into the appropriate group for transmission.
531	HAR/IVR	4.5.2	There shall be a HAR talk group for the entire Springfield area.
532	HAR/IVR	4.5.2	The HAR/IVR central server shall broadcast audio HAR/IVR messages for each talk group.
533	HAR/IVR	4.5.2	New audio messages shall be automatically created and broadcast as information is updated in the ATMS.
534	HAR/IVR	4.5.2	The system shall automatically activate HAR beacons when the HAR is transmitting an important traffic related message for motorists.
545	Web	4.8	Access to the web page shall be via http/ip protocol (details to be determined).
546	Web	4.8	The web page shall contain hot links that will provide access to the CU Transit web page, City of Springfield web page, MoDOT web page, and the Springfield/Branson Regional Airport web page.